

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Amend claims 1 and 18, as follows.

Listing of Claims:

1 **1. (Currently amended)** A method of voice activity detection
2 comprising:
3 determining a difference between (a) an average ratio of energy
4 above a first threshold frequency in a signal comprising multiple
5 frequencies and energy below the first threshold frequency in the signal
6 and (b) a present ratio of energy above the first threshold frequency in the
7 signal and energy below the first threshold frequency in the signal; and
8 in response to the difference ~~either being exceeded by a first~~
9 ~~threshold value or exceeding a second threshold value greater than the~~
10 ~~first threshold value~~, indicating that the signal includes a voice signal; and
11 in response to the difference exceeding a second threshold value
12 greater than the first threshold value, indicating that the signal includes a
13 voice signal.

1 **2. (Original)** The method of claim 1 wherein:
2 the first threshold frequency is about 2400 Hz.

1 **3. (Original)** The method of claim 1 further comprising:
2 prior to the determining, removing noise energy from the signal.

1 **4. (Original)** The method of claim 3 wherein:
2 removing comprises
3 filtering out from the signal frequencies below a second threshold
4 frequency lower than the first threshold frequency.

1 **5. (Original)** The method of claim 4 wherein:
2 the second threshold frequency is about 100 Hz.

1 **6. (Original)** The method of claim 1 further comprising:
2 repeating the steps for successive segments of the signal.

1 **7. (Original)** The method of claim 1 further comprising:
2 determining an average periodicity of the signal; and
3 in response to the average periodicity of the signal being lower than
4 a third threshold value, indicating that the signal includes a voice signal.

1 **8. (Original)** The method of claim 7 wherein:
2 determining an average periodicity comprises
3 estimating a pitch period of the signal;
4 determining a gain value of the signal over the pitch period as a
5 function of the estimated pitch period;
6 determining a periodicity of the signal over the pitch period as a
7 function of the estimated pitch period and the gain value; and
8 averaging the determined periodicity with previously-determined at
9 least one said determined periodicity.

1 **9. (Original)** The method of claim 7 further comprising:
2 repeating the steps for successive segments of the signal.

1 **10. (Original)** The method of claim 7 further comprising:
2 determining a difference between average total energy in the signal
3 and present total energy in the signal; and
4 in response to the difference between the average total energy and
5 the present total energy being lower than a fourth threshold value and the
6 average periodicity of the signal being lower than a fifth threshold value,
7 indicating that the signal includes a voice signal.

1 **11. (Original)** The method of claim 10 further comprising:
2 prior to determining the difference between the average total
3 energy and the present total energy, removing noise energy from the
4 signal.

1 **12. (Original)** The method of claim 1 wherein:
2 determining a difference between the average total energy and the
3 present total energy comprises
4 determining a difference between average total energy in a
5 voiceband of the signal and present total energy in the voiceband.

1 **13. (Original)** The method of claim 12 wherein:
2 the voiceband extends from about 100 Hz to about 4000 Hz.

1 **14. (Original)** The method of claim 10 further comprising:
2 repeating the steps for successive segments of the signal.

1 **15. (Original)** The method of claim 14 further comprising:
2 in response to not indicating for a present segment of the signal
3 that the signal includes a voice signal, and indicating for a segment of the
4 signal preceding the present segment that the signal includes a voice
5 signal, determining if the average total energy of the signal exceeds a
6 minimum average total energy of the signal by a sixth threshold value; and
7 in response to the average total energy exceeding the minimum
8 average total energy by the sixth threshold value, indicating that the signal
9 includes a voice signal.

1 **16. (Original)** An apparatus that performs the method of any one
2 of the claims 1-15.

1 **17. (Original)** A computer-readable medium containing executable
2 instructions which, when executed in a computer, cause the computer to
3 perform the method of any one of the claims 1-15.

1 **18. (Currently amended)** An apparatus for detecting voice activity
2 comprising:
3 means for determining an average ratio of energy above a first
4 threshold frequency in a signal comprising multiple frequencies and
5 energy below the first threshold frequency in the signal;
6 means for determining a present ratio of energy above the first
7 threshold frequency in the signal and energy below the first threshold
8 frequency in the signal;
9 means for determining a difference between the average ratio and
10 the present ratio; and
11 means cooperative with the means for determining a difference and
12 responsive to the difference ~~either being exceeded by a first threshold~~
13 ~~value or exceeding a second threshold value greater than the first~~
14 ~~threshold value~~, for indicating that the signal includes a voice signal, and
15 further responsive to the difference exceeding a second threshold value
16 greater than the first threshold value, for indicating that the signal includes
17 a voice signal.

1 **19. (Original)** The apparatus of claim 18 further comprising:
2 means for determining an average periodicity of the signal; and
3 means cooperative with the means for determining an average
4 periodicity and responsive to the average periodicity being lower than a
5 third threshold value, for indicating that the signal includes a voice signal.

1 **20. (Original)** The apparatus of claim 19 further comprising:
2 means for determining a difference between average total energy in
3 the signal and present total energy in the signal; and

4 means cooperative with the means for determining a difference
5 between the average total energy and the present total energy and the
6 means for determining an average periodicity and responsive to the
7 difference between the average total energy and the present total energy
8 being lower than a fourth threshold value and the average periodicity of
9 the signal being lower than the fifth threshold value, for indicating that the
10 signal includes a voice signal.

1 **21. (Original)** The apparatus of claim 20 for detecting voice activity
2 in successive segments of the signal, further comprising:
3 means responsive to a lack of indication for a present segment of
4 the signal that the signal includes a voice signal and to an indication for a
5 segment of the signal preceding the present segment that the signal
6 includes a voice signal, for determining if the average total energy of the
7 signal exceeds a minimum average total energy of the signal by a sixth
8 threshold value; and
9 means cooperative with the means for determining of the average total
10 energy exceeds the minimum average total energy and responsive to the
11 average total energy exceeding the minimum average total energy by the
12 sixth threshold value, for indicating that the signal includes a voice signal.